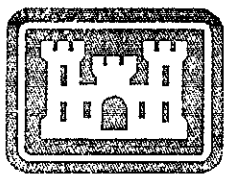
NEW HAMPSHIRE FLOOD PLAIN MANAGEMENT SERVICES

GREAT EAST LAKE
DAM-BREACH FLOOD ANALYSIS
WAKEFIELD, NEW HAMPSHIRE &
NEWFIELD, MAINE

June 1998



US Army Corps
of Engineers

New England District

GREAT EAST LAKE DAM-BREACH FLOOD ANALYSIS

Wakefield, New Hampshire
and
Newfield, Maine

PREPARED FOR:

State of New Hampshire
Department of Environmental Services
Water Resources Division

PREPARED BY:

Water Management Section
Geotechnical and Water Management Branch
Engineering/Planning Division

Department of the Army
New England District, Corps of Engineers
Concord, Massachusetts

June 1998

Great East Lake Dam
Dam-Breach Flood Analysis

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Great East Lake Dam
Dam-Breach Flood Analysis

1. PURPOSE

This report presents the findings of a dam-break flood analysis performed for Great East Lake Dam. The dam is owned, operated, and maintained by the New Hampshire Department of Environmental Services, Water Resources Division. Included in the report is a description of pertinent features of the dam, procedures used for the analysis, assumed dam-break conditions, and the resulting effect on downstream flooded areas, particularly the town of Milton. This study was not performed because of any known likelihood of a dam-break at this dam. The purpose is to provide information for emergency planning use.

The dam-break flood analysis was conducted at the request of the state of New Hampshire, under the authority of the Corps of Engineers Section 206 Flood Plain Management Services (FPMS) program. This report presents the findings of dam-break analysis performed for flood (estimated March 1936, flood of record, inflow into pool) conditions.

2. MODEL DESCRIPTION

Dam-break analysis for Great East Lake Dam was conducted using Boss Corporation's 1992 release of the National Weather Service Dam-Break Flood Forecasting Computer Model developed by D.L. Fread. Input for the model consists of storage characteristics of the reservoir, selected geometry and duration of breach development, and hydraulic roughness coefficients for the downstream channel. Detailed descriptions of this data are discussed later in this report. Based on input data, the model computes the breach outflow hydrograph and routes it downstream. The analysis provides output on the attenuation of the flood hydrograph, and timing of the flood wave as it progresses downstream. These results are also discussed in detail.

3. DESCRIPTION

a. General. The Salmon Falls River originates in Wakefield, NH and flows south for approximately 39 miles along the Maine-New Hampshire border through Milton, East Rochester, and Dalton, NH to its confluence with the Cocheco River to form the Piscataqua. A significant tributary in the study area is the Branch River which originates in Brookfield, NH and flows southeast for 16 miles through Middleton and Milton, NH to its confluence with the Salmon Falls River, approximately 12 miles downstream of Great East Lake Dam. Another tributary, Miller Brook, originates in Wakefield, NH and flows southeast for 3 miles to its confluence with the Salmon Falls River in Milton, NH, approximately 8 miles downstream of Great East Lake Dam. The topography of the drainage area is rolling terrain and is heavily wooded.

The study extended from Great East Lake Dam in Wakefield, NH, downstream along the Salmon Falls River, through Horn Pond, Hopper Street, Church Street, School Street, Milton Three Ponds, and Milton Leather Board Dams for a distance of approximately 16.74 miles. The drainage area contributing to the study reach increases from 16.0 square miles at Great East Lake Dam to 108.0 square miles at Milton Three Ponds Dam. The total study reach is shown on Plate 1.

b. Great East Lake Dam. Great East Lake Dam is located on the southern end of the impoundment, across the Maine-New Hampshire state line in Wakefield, New Hampshire and Newfield, Maine. The location of Great East Lake Dam is shown on Plate 1. It is the upstream dam in a series of dams which impound the waters of the Salmon Falls River. The surrounding land is heavily wooded with rolling terrain with many cottages located along the shore. The total drainage area of Great East Lake is 16.0 square miles. Information listed in Table 1, and Table 2 was taken from the National Dam Inspection Program "Phase I Inspection Report, Great East Lake Dam", January 1979.

TABLE 1

General Dam Information

Name of Dam	Great East Lake Dam
Identification Number	NH00111
Town	Wakefield, NH and Newfield, Maine
County and State	Carroll, NH and York, Maine
Stream	Salmon Falls River

Great East Lake Dam (location shown on Plate 1, and plan and profile shown on Plate 2) is a concrete gravity dam, approximately 68 feet long, with a hydraulic height of 16.2 feet above streambed and top of dam elevation of 575.4 feet NGVD. The spillway consists of a two concrete broad crested weirs 20'-6" in length with a crest elevation of 573.4 feet NGVD. A concrete sluiceway structure at invert 562.9 feet NGVD contains a gate-operated, low-level outlet 12.0 feet high by 6.0 feet wide. The gate is operated mechanically with the gate house located directly above the gate. The spillway discharge channel is approximately 10 feet deep and 10-15 feet wide consisting of vertical stone walls for a reach of approximately 1,800 feet downstream of the dam.

Table 2

Pertinent Data
Great East Lake Dam

a. Drainage Area. Great East Lake Dam controls a drainage area of 16.0 square miles consisting of rolling to steeply sloping terrain.

b. Elevations (feet NGVD)

(1) Top of dam - 575.4
(2) Spillway crest - 573.4

c. Reservoir Storage* (acre-feet)

(1) Spillway crest - 23,760 acre-feet
(2) Top of dam - 27,700 acre-feet

d. Dam

(1) Type - concrete gravity dam
(2) Length - 67.8 feet
(3) Height - 16.2 feet above streambed
(4) Topwidth - varies
(5) Side Slopes
upstream varies: vertical
downstream varies: varies
(6) Impervious core - none
(7) Cutoff - unknown
(8) Grout curtain - unknown

e. Spillway

(1) Type - concrete broad crest weir
(2) Length of weir - 41 feet (2 @ 20'-6")
(3) Crest elevation - 573.4 feet NGVD
(4) Gates - stoplogs
(5) Upstream channel - none

f. Regulating Outlet

(1) Invert - 562.9 feet NGVD
(2) Size - 12.0 feet high by 6.0 feet wide
(3) Description - low-level sluiceway opening
(4) Control - wooden sluice gate

* Estimated above channel invert at dam
(from Phase I Inspection Report)

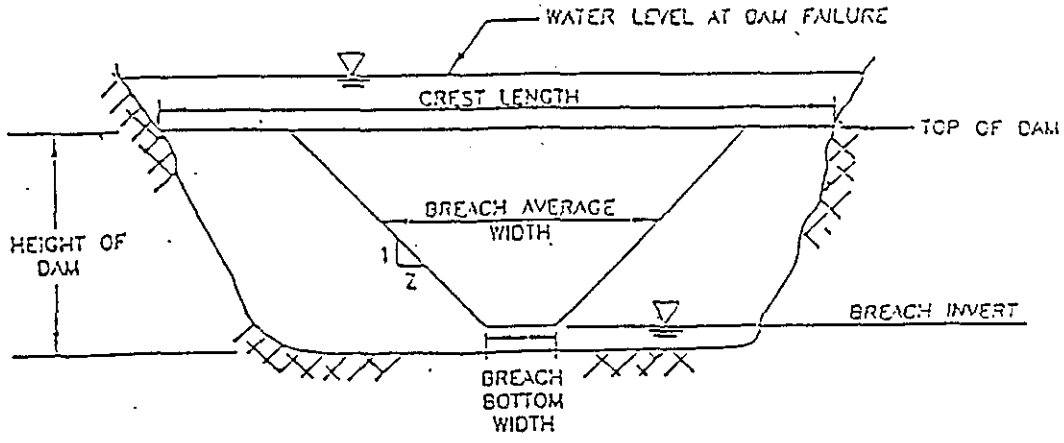
c. Downstream Valley. The river downstream of Great East Lake Dam is steep to Horn Pond averaging approximately 162 feet per mile. A dam is located at the end of Horn Pond, approximately 1.65 miles downstream of Great East Lake Dam. It is a concrete gravity dam between earth abutments. The concrete portion of the dam is 21.1 feet high and 77.5 feet long. Downstream of Horn Pond, the channel slope is relatively steep averaging 51 feet per mile. There are several small flow structures and road crossings across the Salmon Falls River between Horn Pond and the beginning of Milton Three Ponds (Milton, Townhouse, and Northeast Ponds), approximately 9 miles downstream. When the river enters Milton Three Ponds, the valley widens and becomes relatively flat with an average slope of 6 feet per mile. A concrete gravity dam located at the end of Milton Three Ponds (16.4 miles D/S of Great East Lake Dam) is 19 feet high and 200 feet long. The river valley downstream of Milton Three Ponds Dam is steep to Spaulding Pond averaging approximately 100 feet per mile.

A minimum number of detailed surveys of the river channel and crossings were performed as part of this study. These were supplemented with surveys and cross section information obtained from Flood Insurance Studies for the towns of Milton and Rochester, NH.

4. METHOD OF ANALYSIS

a. General. This section discusses the methods and assumptions used in the dam-break analysis. The magnitude of a flood resulting from a hypothetical dam-breach depends not only on the size of the project but also on the conditions of failure including the initial level of the reservoir, size of the breach, rate of breach formation, as well as hydraulic features and initial flows in the downstream river channel. The state of New Hampshire has adopted a criteria for the initial reservoir inflow prior to failure to be equal to the flood of record in the watershed where the dam is located. At Great East Lake the flood of record is the March 1936 event. That discharge together with appropriate discharges from downstream uncontrolled drainage areas is used as the initial flow prior to dam failure.

b. Assumed Breach Parameters. The discharge hydrograph of a breach is a function of the inflow hydrograph and breach parameters (time of breach formation, size, and shape of breach) of a hypothetical dam failure. The following sketch illustrates the various dam breach parameters for a typical earthen or concrete-gravity dam. Total outflow is a combination of flows through the breach and spillway. As the breach develops, so does the breach discharge.



DEFINITION SKETCH OF BREACH PARAMETERS

Assumed Great East Lake Dam Failure Condition

Est. Reservoir Outflow: 600 cfs (est. March 1936 flow)

Pool Level at Failure: 577.1 feet NGVD
(1.7' above top of dam)

Breach Invert: 562.9 feet NGVD
(invert at low-level sluiceway opening)

Breach Bottom Width: 68.0 feet with side slopes 1V:0H

Time to Complete Formation of Breach: 0.5 hours

Downstream Reach Roughness
(Manning's "n" Values): 0.029 to 0.12

Prebreach Downstream Lateral Inflow: Estimated March 1936 flood flows

c. Assumed Prebreach Flows. Assumed pre-breach flows on the Salmon Falls River for the dam failure simulation were developed for the downstream watershed. These are the assumed flows from antecedent conditions that would be expected to occur with or without a dam failure. Based on hydrologic conditions of the downstream watershed, lateral inflows, representing contributing flow from downstream tributaries and local runoff areas, were included at river miles 7.9, and 12.2 (stationing is in river miles downstream of Great East Lake Dam). The contributing net drainage areas at river miles 7.9 and 12.2 were 3.1, and 57.0 square miles.

The discharge from Great East Lake Dam was added to lateral inflows at downstream points equal to the estimated March 1936 flows. With the adopted pre-breach conditions at the dam, due to uncontrolled spillway discharge and downstream inflows associated with these rare events, downstream channel capacities would have been exceeded and flooding would have occurred prior to a dam-breach.

d. Downstream Channel Routing. A downstream channel routing analysis allows the breach discharge hydrograph to be characterized at points of interest below the dam. The downstream channel stationing adopted is in river miles below Great East Lake Dam, with river mile 0.0 at the dam. A breach hydrograph is attenuated and stored through the downstream channel and flood plain. The degree to which this breach discharge is attenuated is a function of the downstream valley storage capacity and valley roughness characteristics.

The dynamic wave method of channel routing is used in the NWS DAMBRK computer program to route the flood wave downstream. This is a hydraulic routing method that solves the complete unsteady flow equations through a given reach. Results of this method indicate attenuation of the flood wave, resulting flood stages, and the time it takes the wave to reach a section of the river.

Downstream valley data were determined by obtaining selected cross sections from HEC-2 input files from Milton and Rochester, NH Flood Insurance Studies. On the average, approximately three cross sections per mile were used to represent the downstream valley. Manning's "n" values were assigned to the channel and overbanks on the basis of the HEC-2 analysis and field observations. Discharge and stage hydrographs were selected at twenty downstream stations including river miles 0.0, 1.65, 6.7, 7.6, 16.4, and 16.7 (cross sections with dams). The locations of these twenty cross sections are shown on Plates 3 and 4. These twenty were selected to characterize the movement and attenuation of the dam-breach flood wave as it progresses downstream.

The geometry input to define the downstream channel does not include detailed bridge information. This study does not attempt to determine if any downstream structures will or will not fail during a dam-break at Great East Lake Dam. For this study, the dam structures were modeled as remaining intact. This approach was viewed as the most conservative one, resulting in higher peak water surface elevations behind them than if the dams were breached.

5. RESULTS OF ANALYSIS

a. General. This section discusses results of the dam failure analysis at Great East Lake Dam. The results presented assume that the impoundment water surface elevation is 1.7 feet above the top of dam with full spillway discharge occurring, and that the dam-breach flood is superimposed on pre-breach flood flow within the downstream channel reaches.

b. Inflow Hydrograph. The peak outflow from Great East Lake Dam resulting from the March 1936 storm event was assumed to be 600 cfs. This outflow was estimated from a drainage area ratio analysis of the flow records for March 1936 at the USGS gaging station on the Salmon Falls River at East Lebanon, Maine.

c. Reservoir Storage Capacity. Storage volumes for Great East Lake were obtained by a combination of calculated surface areas above water surface from USGS Quad sheets (1:24000, 20-foot contour) and information provided in the Phase I report for Great East Lake Dam.

d. Breach Discharge Hydrograph. Table 3 summarizes the peak discharge and downstream channel routing results at selected cross sections.

The failure at Great East Lake Dam resulted in a peak breach discharge of approximately 6,700 cfs. The assumed water surface was at 1.7 feet above the top of the dam, elevation 577.1 feet NGVD when failure began, and the breach was modeled to develop fully within 0.5 hours. Plates 5 - 9 show the pre-breach and dam-breach flood profiles for the study reach; Plates 10 and 11 show the breach discharge and stage hydrographs for selected cross sections throughout the reach. Plate 12 shows how the breach flood peak discharge varies with distance downstream.

TABLE 3
Great East Lake Dam Failure
Downstream Channel Routing Results

Downstream Location (River Miles)	Peak Discharge (cfs)*	Peak Elevation (ft NGVD)	Time to Peak Elevation (hours)**	Prebreach Flow Elevation	Increase in Depth of Flow (feet)
0.01	6700	576.2	0.5	560.2	16.0
Horn Pond Dam (1.65)	3570	560.4	9.1	555.8	4.6
4.1	3520	510.4	16.8	507.8	2.6
Hopper Street Dam (6.7)	3270	508.8	18.2	506.6	2.2
Church Street Dam (7.6)	3270	442.4	18.2	440.7	1.7
School Street Dam (7.8)	3270	438.3	18.7	435.3	3.0
12.2	3360	421.5	31.8	419.7	1.8
Milton Three Ponds Dam (16.4)	6910	421.2	31.8	419.6	1.6
Milton Leather Board Dam (16.7)	6910	403.2	31.8	402.4	0.8

* Includes inflow from downstream watersheds
* Time to peak measured from start of breach at Great East Lake Dam

6. DOWNSTREAM CHANNEL ROUTING

Plates 5 - 9 show peak water surface profiles resulting from the pre-breach initial flow and failure flow. The peak dam-breach discharge computed by the DAMBRK computer program is about 6,700 cfs. This flow results in a stage increase of about 16.0 feet over the prebreach high flow just downstream of the dam. The peak breach discharge attenuates to about 3,600 cfs at river mile 1.65, and increases to 6,900 cfs at rivermile 16.4 due to high pre-breach flows. The breach flow would overtop Milton Three Ponds Dam by approximately 3.5 feet. At areas below this point, peak stages would only be about 1.0 feet above the assumed pre-breach flows.

The dams located downstream of Great East Lake Dam within the study reach are Horn Pond Dam (RM 1.65), Hopper Street Dam (RM 6.7), Church Street Dam (RM 7.6), School Street Dam (RM 7.8), Milton Three Ponds Dam (RM 16.4), and Milton Leather Board Dam (RM 16.7). The intent of this study is not to determine if, or when, these dams would fail. The adopted dam-breach conditions assume that these dams remain. The water level could get several feet above the top of the dams before it fails. Therefore, the worst case scenario (assuming these dams do not fail) was used in the final results presented in the tables and various plots to get an indication of the maximum potential levels and inundation that could occur.

The analysis was conducted in two reaches; reach one was from Great East Lake Dam (RM 0.0) to Horn Pond Dam (RM 1.65), and reach two was from Horn Pond Dam (RM 1.65) to downstream of Milton Leather Board Dam (RM 16.74). The time to peak elevation, as shown in Table 3, is an important factor in determining emergency evacuation procedures. As mentioned previously, Great East Lake Dam was assumed to fail in 0.5 hours and due to topographic and physical features the maximum breach width would be in the order of 70 feet. Also, Great East Lake is a large impoundment with a surface area of 1,800 acres and an estimated storage capacity (above the invert at the dam) of 27,700 acre-feet with the water surface at the top of the dam.

A rapid failure (0.5 hours) of the 16.2 feet high dam results in a fast rise to a peak discharge of about 6,700 cfs. However, as time progresses the major portion of the breach hydrograph consists of water discharging from the large storage capacity of the lake. The initial fast rising breach hydrograph is attenuated within the surcharge storage of the downstream Horn Pond Dam impoundment. Analysis of the breach hydrograph and the hydrograph at mile 1.65 shows that about 5,800 acre-feet of storage is utilized between the pre-breach stage of 12 feet and the peak stage of 16 feet (spillway crest at 10.4 feet stage). This reduces the hydrograph peak discharge and results in increasing the time to peak stage as the flood wave passes through Horn Pond. Discharge and stage hydrographs throughout the reach are shown in Plates 10 and 11.

From Horn Pond Dam (RM 1.65) to School Street Dam (RM 7.8) the time to peak stage increases from 9.1 hours to 18.7 hours. In the reach from School Street Dam (RM 7.8) to the beginning of Milton Three Ponds (RM 12.2) the peak time increases from 18.7 hours to 31.8 hours. The channel downstream of School Street Dam changes from having a gradual slope to having a flat profile at RM 12.2, and the valley widens significantly at RM 12.2 due to the large surface area of Milton Three Ponds. The changes in the valley characteristics along with Milton Three Ponds Dam (RM 16.4) drop the flow velocity from 5.4 feet per second at School Street Dam to less than 1.0 foot per second throughout Milton Three Ponds resulting in the significant increase in the time to peak stage. Discharge and stage hydrographs for this reach are shown on Plates 10 and 11. We note that the flood wave progresses downstream at a relatively slow speed therefore time to peak stage is long. This is attributed mainly to the flat slope and floodplain storage along the Salmon Falls River.

The increase in the dam-breach flood over the assumed pre-breach flood levels is an indication of the flooding that can be expected as a result of a dambreak. It is again noted, that the assumed pre-breach flood conditions are rare conditions, and there would be flooding prior to failure. These pre-breach high flows are due to uncontrolled spillway discharges at the dam, along with downstream lateral inflows and not attributable to a dam failure.

7. INUNDATION MAPPING

The limits of inundation were computed by routing the breach discharge hydrograph through the downstream valley cross sections and delineating the resulting maximum stages on the base map. The base map used is based on a 20-foot contour interval 1:24,000 scale USGS quadrangle and, therefore, inundation limits shown on Plates 3 and 4 are only approximate. Inundation mapping with a larger scale of 1":1,000' is provided in Appendix I. Locations of the twenty selected downstream stations are graphically illustrated on Plates 3 and 4. Although any structures shown within these limits were assumed to be inundated, certain structures may be excluded as a result of local conditions and elevations.

8. DISCUSSION

The dam-break analysis for Great East Lake Dam was based on engineering application of certain laws of physics, considering the physical characteristics of the project and downstream channel and conditions of failure. Due to the highly unpredictable nature of a dam-break and the ensuing sequence of events, the results of this study should not be viewed as exact but only as an approximate quantification of the dam-break flood potential. For purposes of analysis, downstream conditions are assumed to remain constant, and no allowance is made for possible enlargement or relocation of the river channel due to scour or temporary damming effects, all of which could affect, to some

extent, the resulting magnitude and timing of flooding.

The results of a dam failure could be catastrophic at areas downstream of the dam. However, for the adopted pre-breach flows, due to uncontrolled spillway discharges and downstream inflows associated with these rare events, channel capacities would have been exceeded and flooding would have occurred prior to a dam-breach at the dam. It should be noted that a dam failure occurring during a more frequent (less severe) event would result in a more prominent rise over pre-breach flood levels. However, the peak breach levels and flooded areas would be less than the adopted results.

Also, this study does not attempt to determine if any downstream structures will or will not fail during a dam-break at Great East Lake Dam. For this study, the dam structures were modeled as remaining intact. This approach was viewed as the most conservative one, resulting in higher peak water surface elevations behind them than if the dams were breached.

The dam-break analysis ended on the Salmon Falls River, about twelve miles downstream of Great East Lake. The state of New Hampshire's criteria for ending dam-breach analyses is to compute the water surface elevation downstream of the dam until the breach water surface elevations are within 2.0 feet of the pre-breach water surface elevations. Great East Lake dam failure flows are within 2.0 feet of pre-breach flow levels downstream river mile 12.2 to river mile 16.74 (end of the analysis).

REFERENCES

U.S. Army Corps of Engineers, New England Division, Phase I Inspection Report - National Dam Inspection Program, Great East Lake Dam, Wakefield, New Hampshire, Concord, MA, January 1979.

U.S. Army Corps of Engineers, New England Division, Phase I Inspection Report - National Dam Inspection Program, Milton Three Ponds Dam, Milton New Hampshire, Concord, MA, August 1978.

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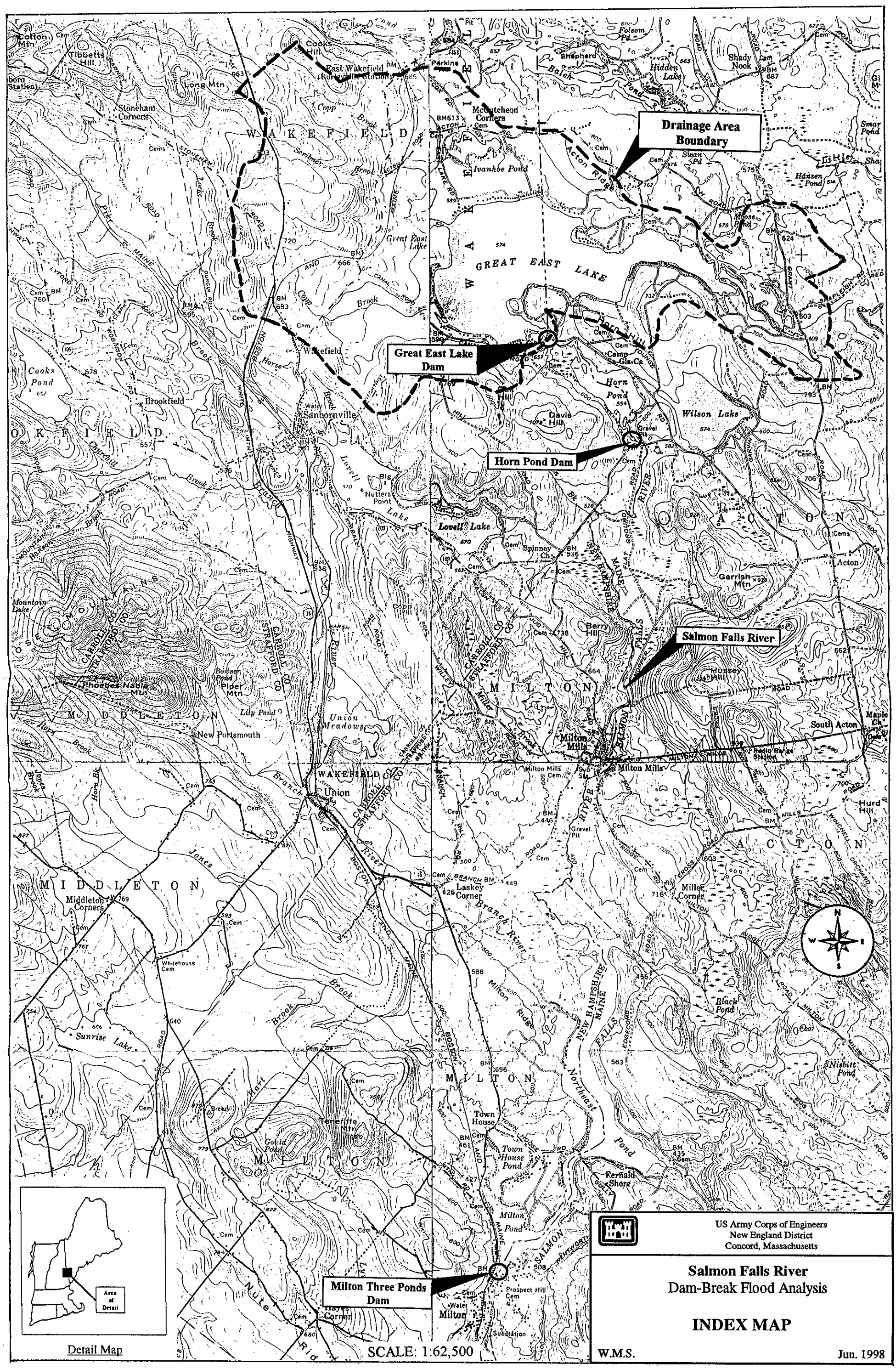
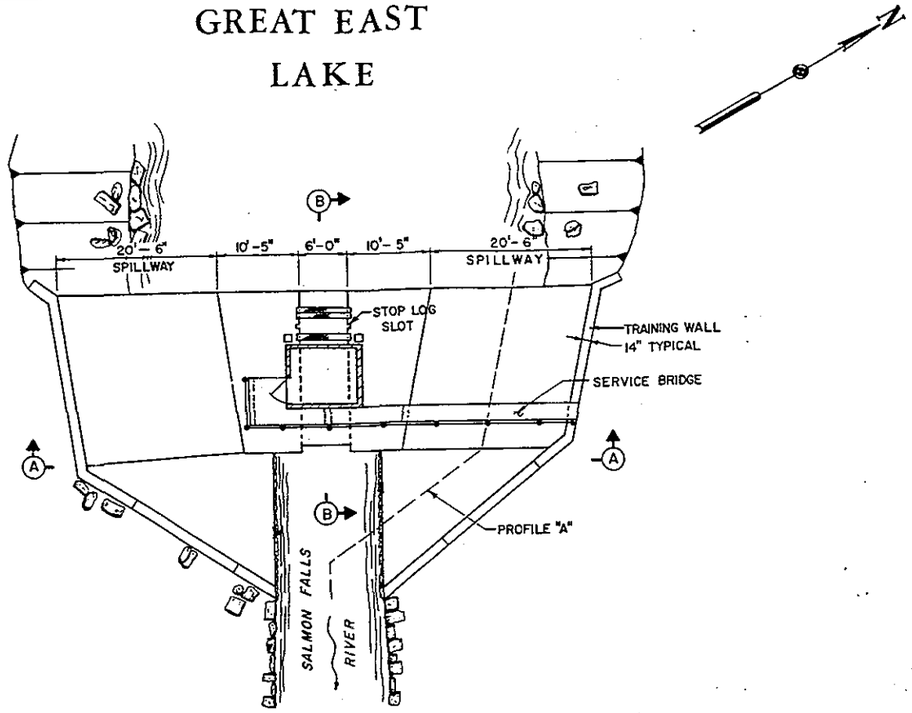
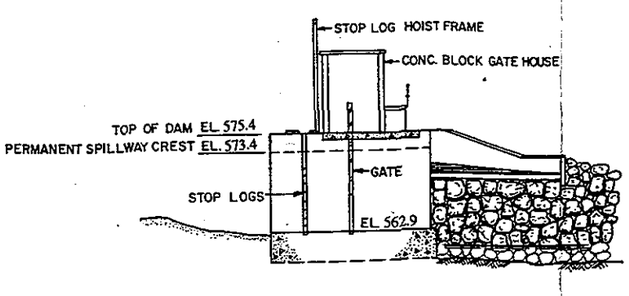
Fread, D.L., DAMBRK: The NWS Dam-Break Flood Forecasting Model, Office of Hydrology, National Weather Service, Silver Spring, MD, June 1988.


Drainage Area Boundary
Great East Lake Dam
Horn Pond Dam
Salmon Falls River
Milton Three Ponds Dam
Area of Detail
Detail Map
SCALE: 1:62,500
US Army Corps of Engineers
New England District
Concord, Massachusetts
Salmon Falls River
Dam-Break Flood Analysis
INDEX MAP
W.M.S.
Jun. 1998
PLATE 1



PLAN



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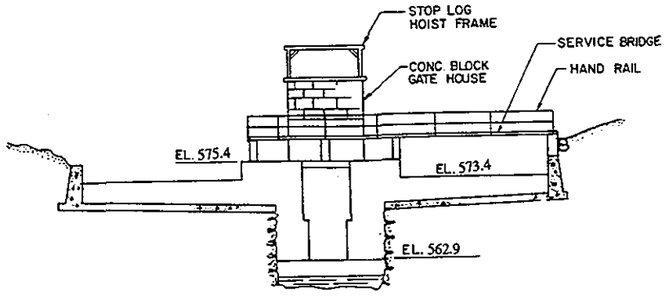
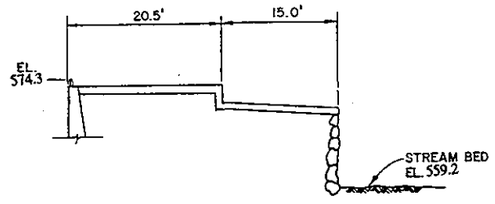


SECTION A-A



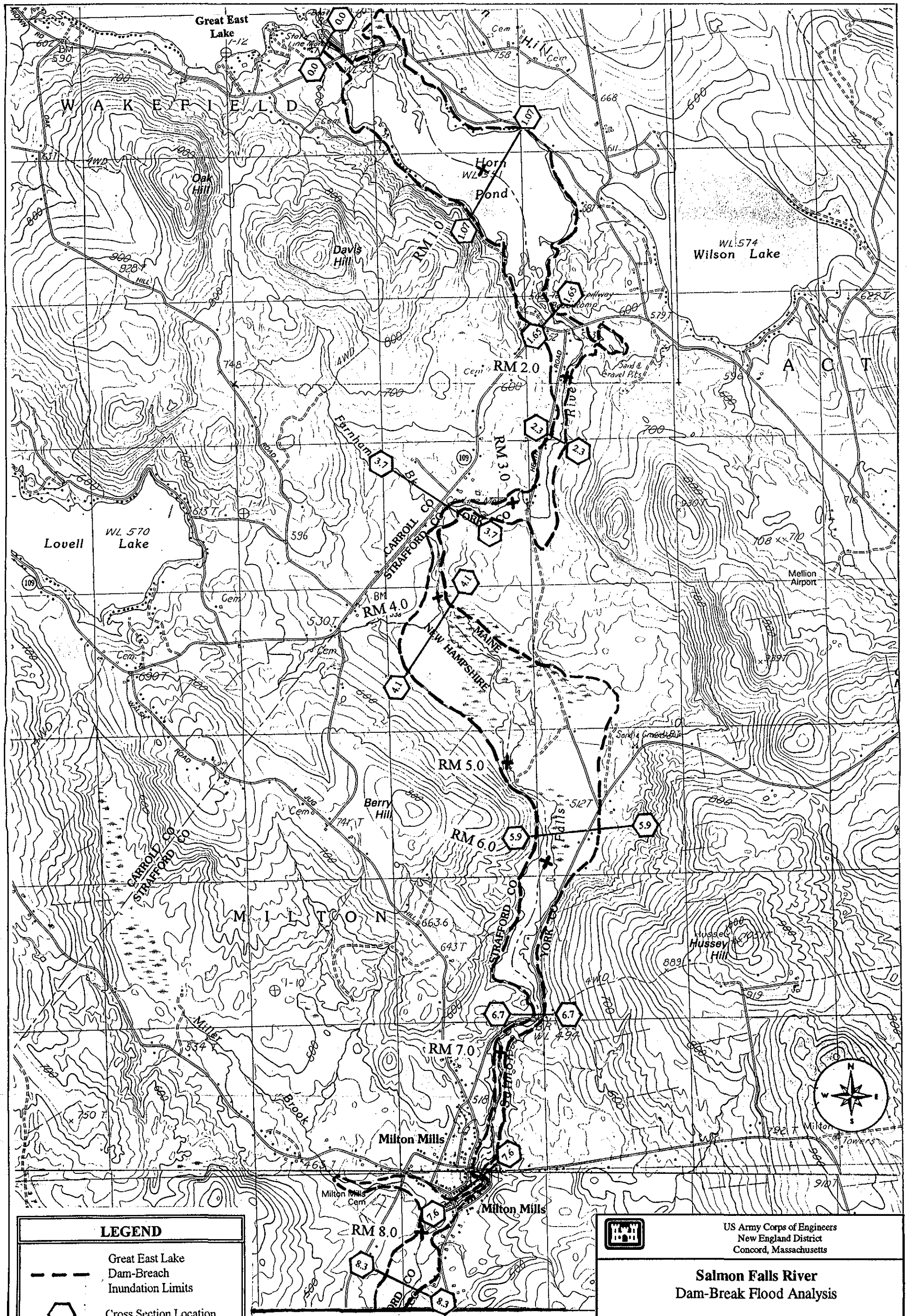
PROFILE "A"
(FOR LOCATION, SEE PLAN)

US Army Corps of Engineers
New England District
Concord, Massachusetts

Great East Lake Dam
Wakefield, NH

Plan, Profile, and Sections

W.M.S. Jun. 1998



LEGEND

- Great East Lake Dam-Breach Inundation Limits
- Cross Section Location
- + RM — River Miles Downstream From Great East Lake Dam

SCALE: 1" : 1,000' Contour Interval 20 Feet

US Army Corps of Engineers
New England District
Concord, Massachusetts

Salmon Falls River
Dam-Break Flood Analysis

INUNDATION MAPPING
Sheet 1 of 2

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PLATE 3

Match Line - Sheet 1

RM 9.0
RM 10.0
RM 11.0
RM 12.0
RM 13.0
RM 14.0
RM 15.0
RM 16.0

Laskey Corner
Miller Corner
Town House
Town House Pond
Fernald Shore
Black Pond
Milton Pond
WL413
Milton
Trailer Park
Prospect Hill Cem
Milton Mills

SALMON FALLS RIVER
NORTHEAST
MILTON RIDGE
MILTON
BOSTON AND MAINE
NEW HAMPSHIRE
MAINE
Milton Ridge

9.4
10.6
11.5
12.2
13.4
14.3
15.3
15.8
16.4
16.7

SCALE: 1" : 1,000' Contour Interval 20 Feet

LEGEND

- Great East Lake Dam-Breach Inundation Limits
- Cross Section Location
- + RM — River Miles Downstream From Great East Lake Dam

US Army Corps of Engineers
New England District
Concord, Massachusetts

Salmon Falls River
Dam-Break Flood Analysis

INUNDATION MAPPING

Sheet 2 of 2

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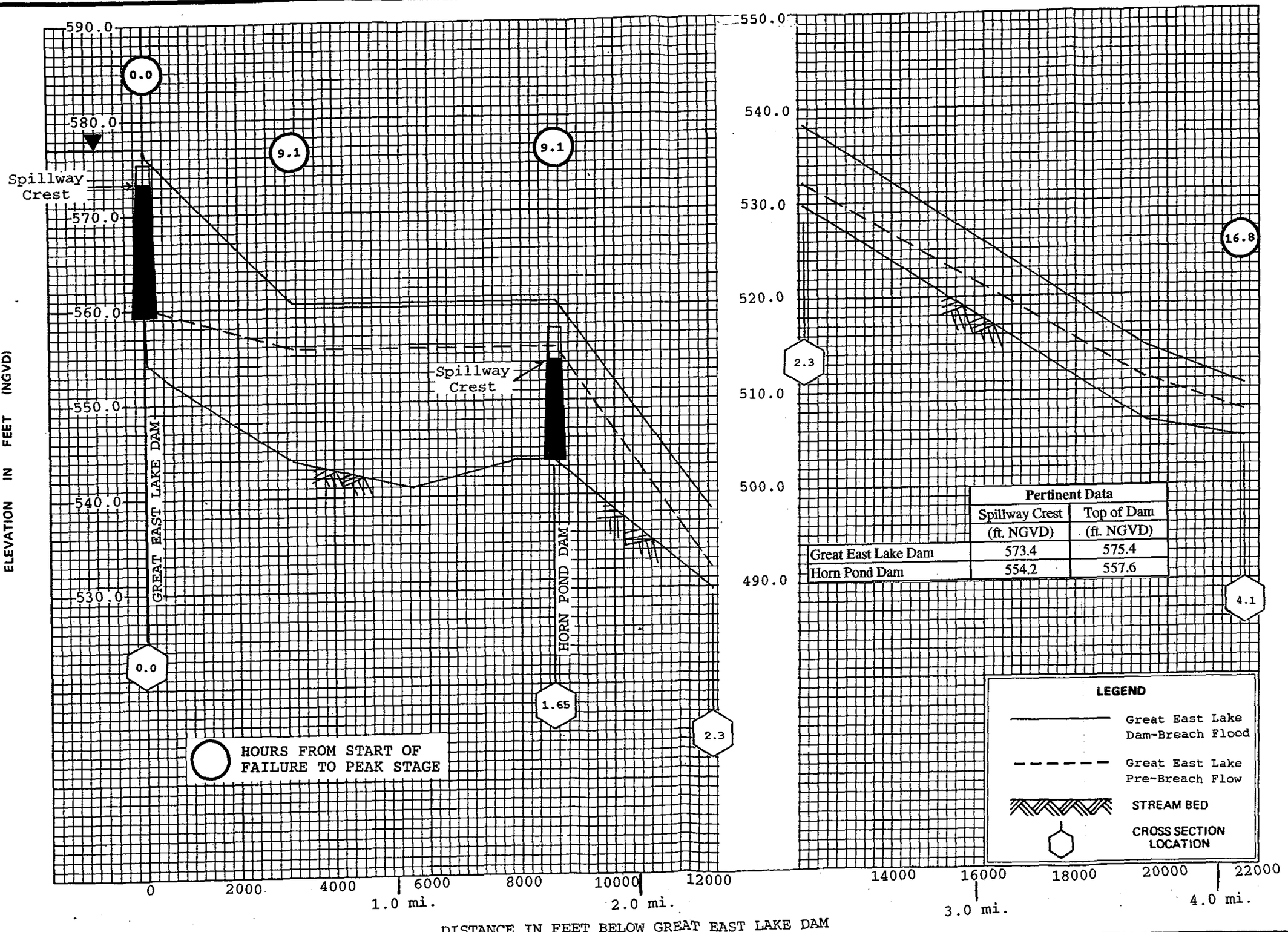
PLATE 4

FLOOD PROFILES

SALMON FALLS RIVER - PROFILE #1



Pertinent Data		
	Spillway Crest (ft. NGVD)	Top of Dam (ft. NGVD)
Great East Lake Dam	573.4	575.4
Horn Pond Dam	554.2	557.6

LEGEND

- Great East Lake Dam-Breach Flood
- Great East Lake Pre-Breach Flow
- STREAM BED
- CROSS SECTION LOCATION

GREAT EAST LAKE DAM
DAM-BREACH FLOOD ANALYSIS

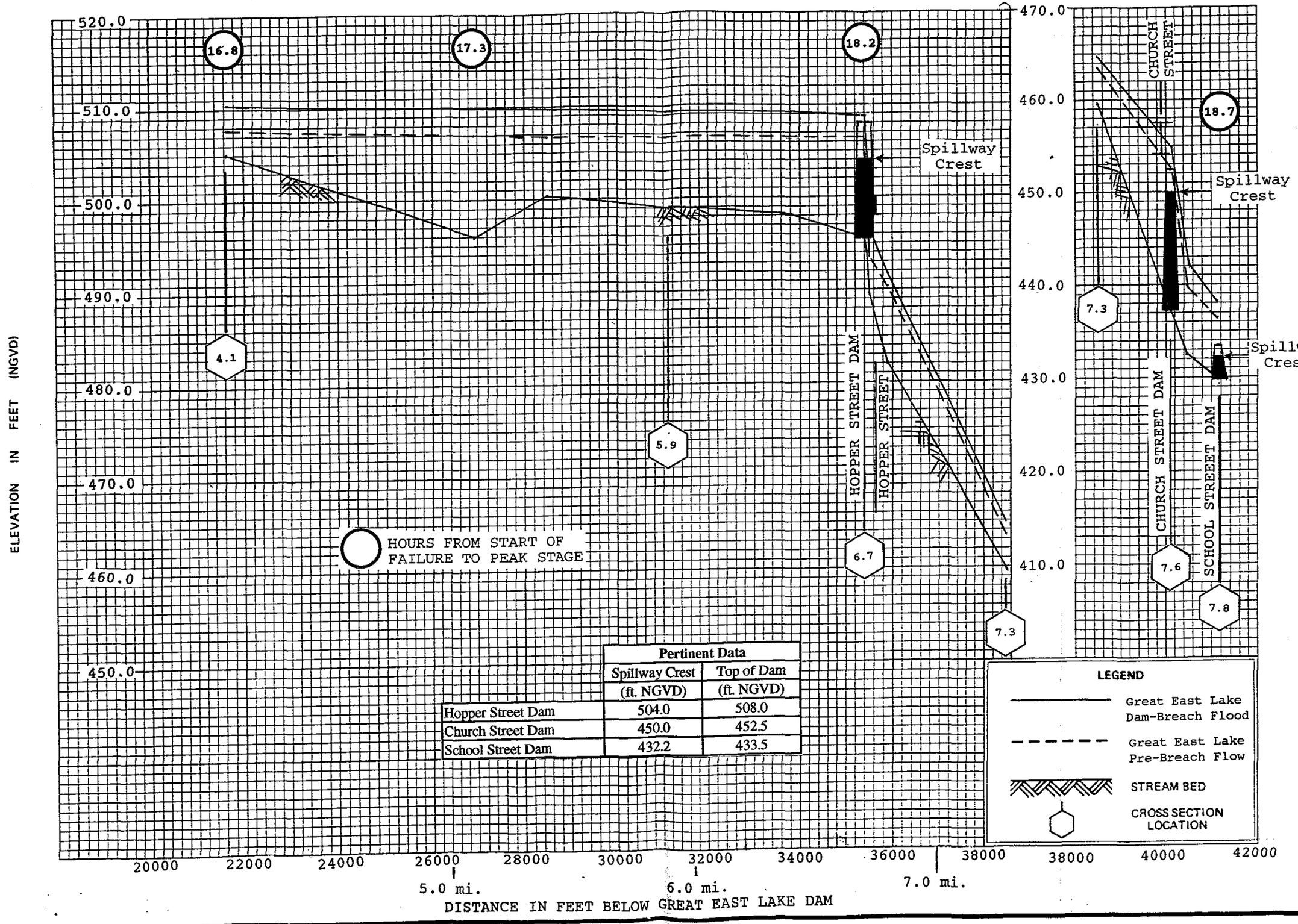
1/5

PLATE 5

FLOOD PROFILES

SALMON FALLS RIVER - PROFILE #2

GREAT EAST LAKE DAM
DAM-BREACH FLOOD ANALYSIS



Pertinent Data		
	Spillway Crest (ft. NGVD)	Top of Dam (ft. NGVD)
Hopper Street Dam	504.0	508.0
Church Street Dam	450.0	452.5
School Street Dam	432.2	433.5

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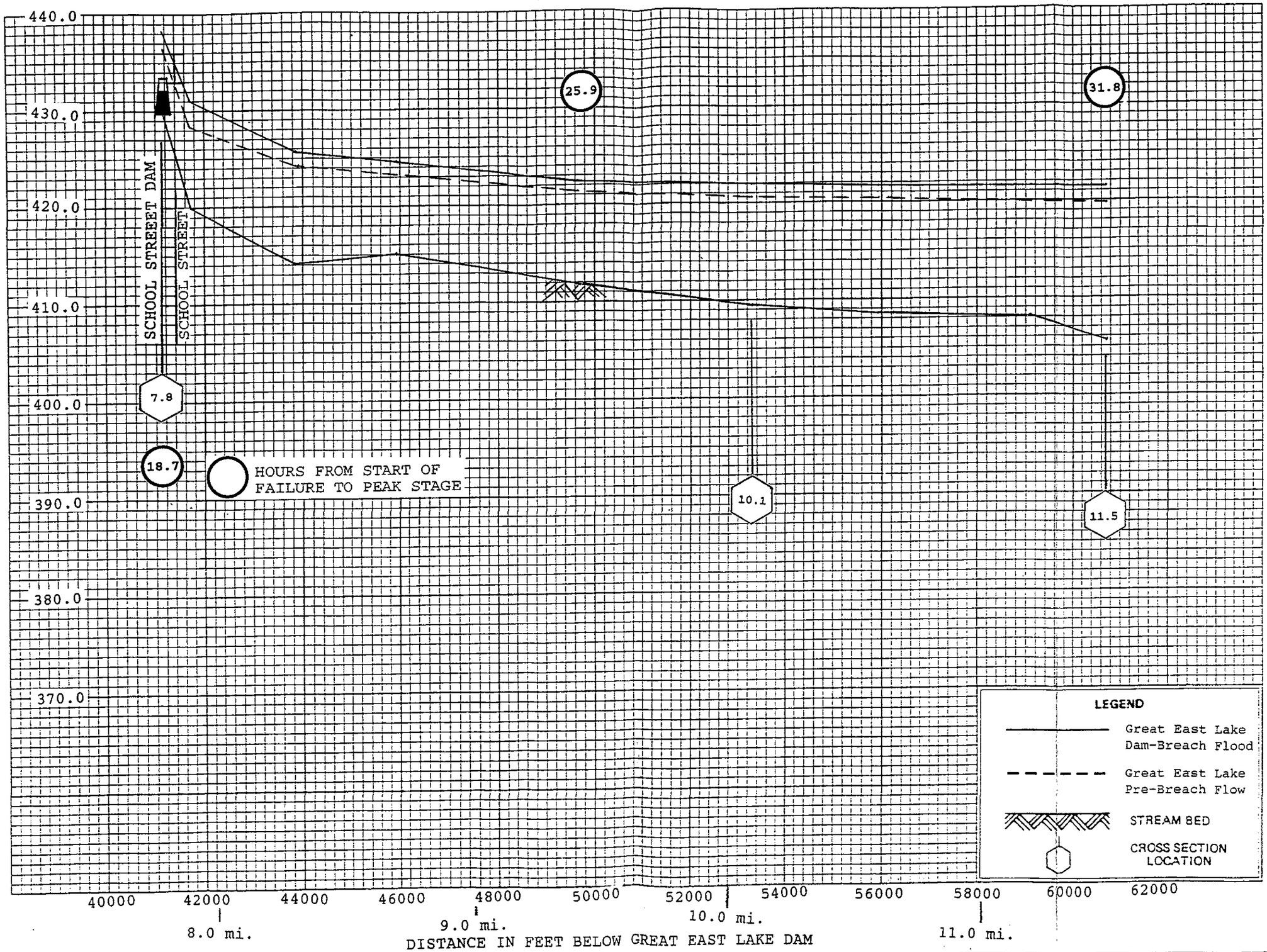
PLATE 6

FLOOD PROFILES

SALMON FALLS RIVER - PROFILE #3

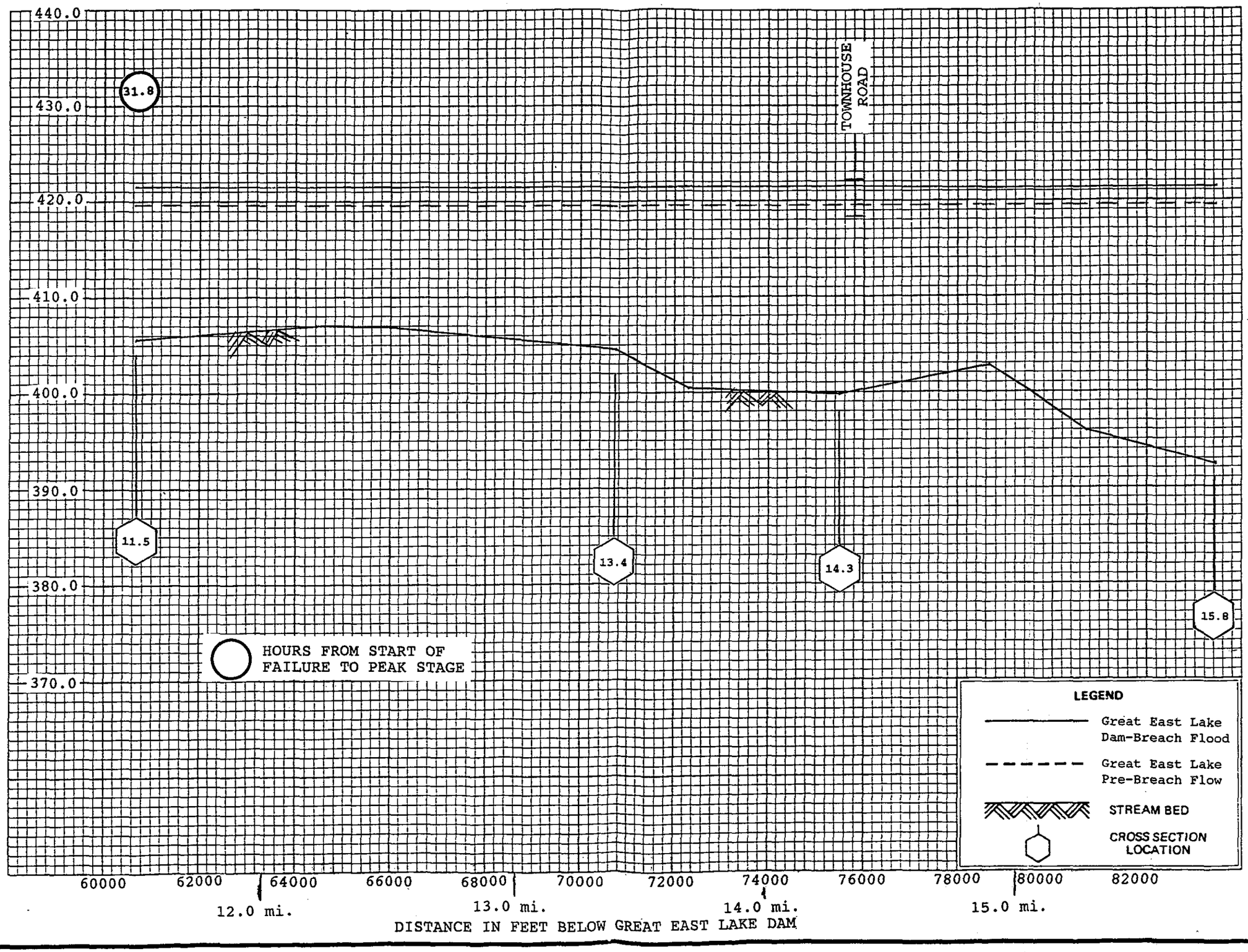


GREAT EAST LAKE DAM

DAM-BREACH FLOOD ANALYSIS

3/5

PLATE 7



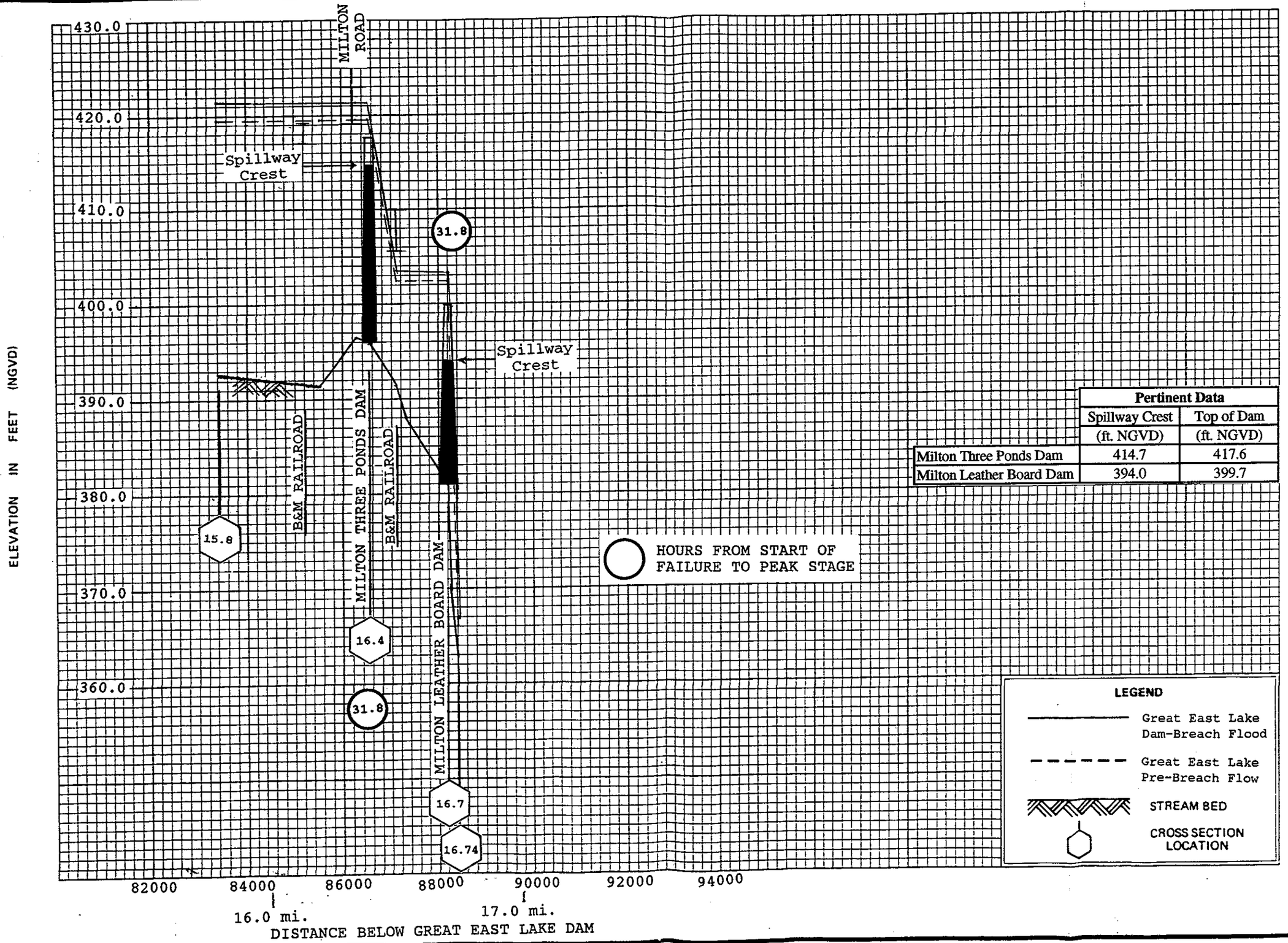
FLOOD PROFILES

SALMON FALLS RIVER - PROFILE #4

GREAT EAST LAKE DAM
DAM-BREACH FLOOD ANALYSIS

4/5

PLATE



Pertinent Data		
	Spillway Crest (ft. NGVD)	Top of Dam (ft. NGVD)
Milton Three Ponds Dam	414.7	417.6
Milton Leather Board Dam	394.0	399.7

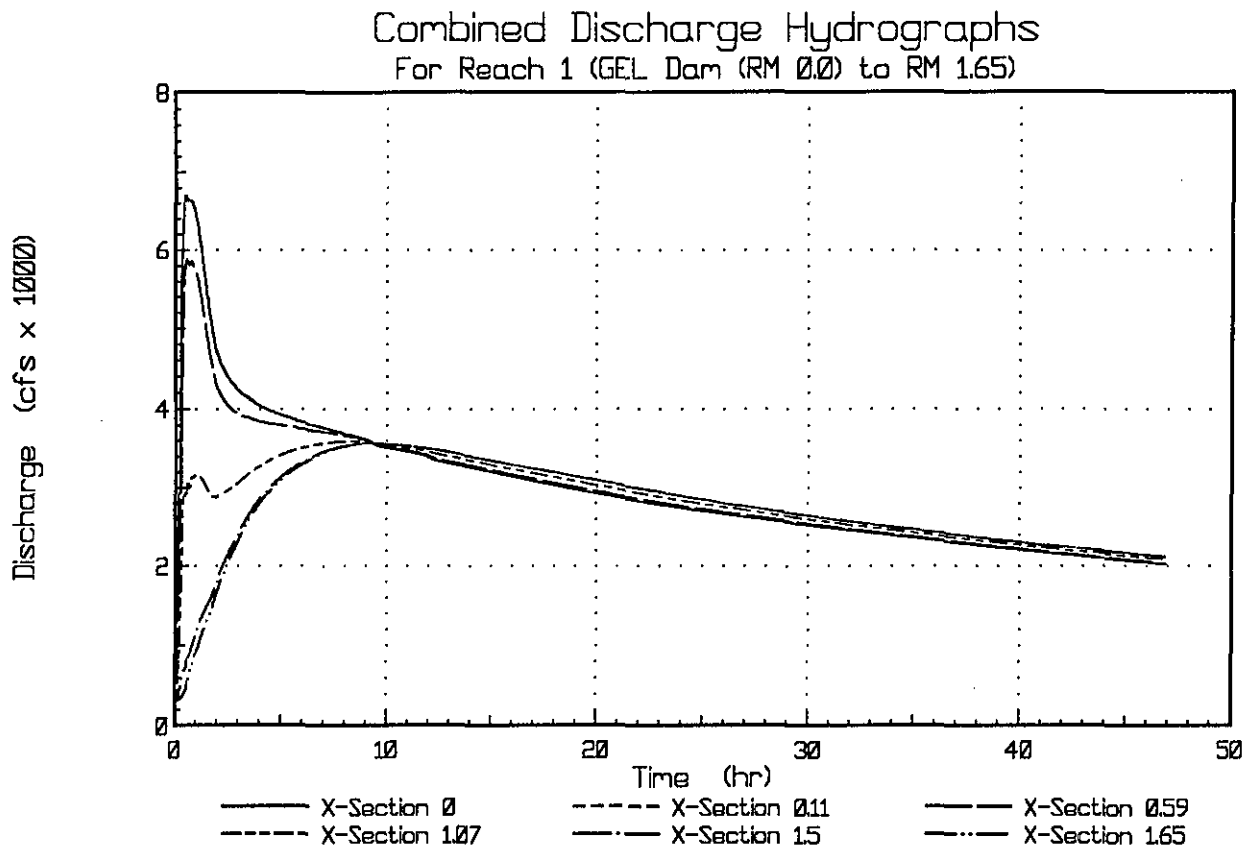
FLOOD PROFILES

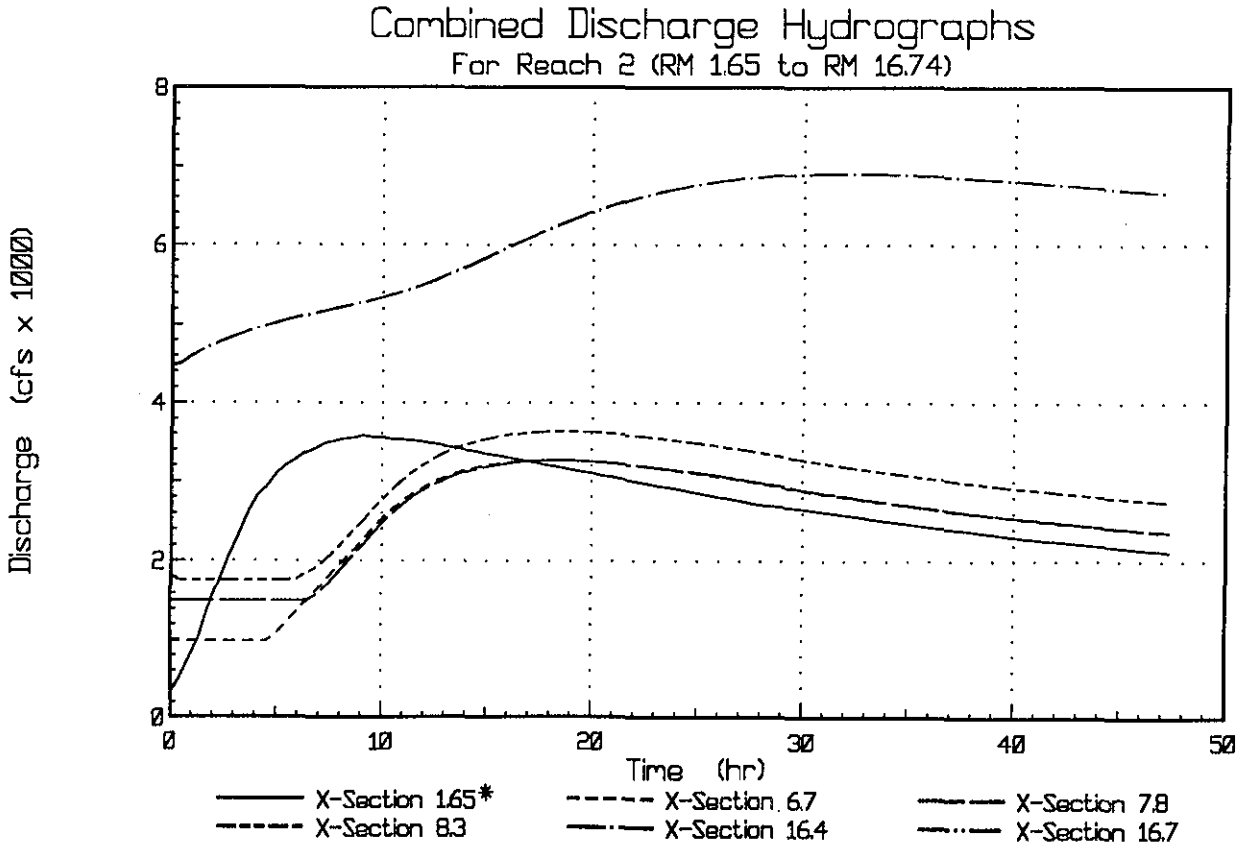
SALMON FALLS RIVER - PROFILE #5

GREAT EAST LAKE DAM
DAM-BREACH FLOOD ANALYSIS

5/5

PLATE 9

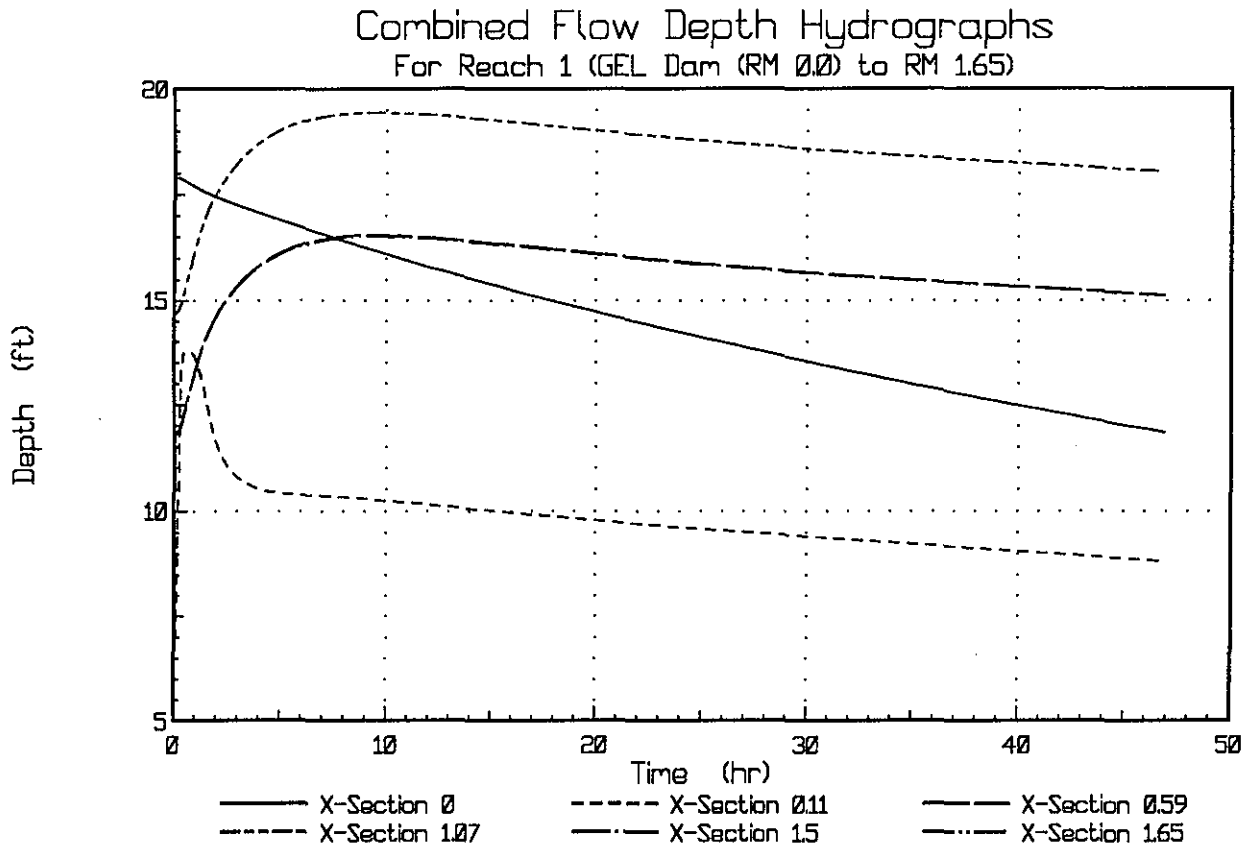


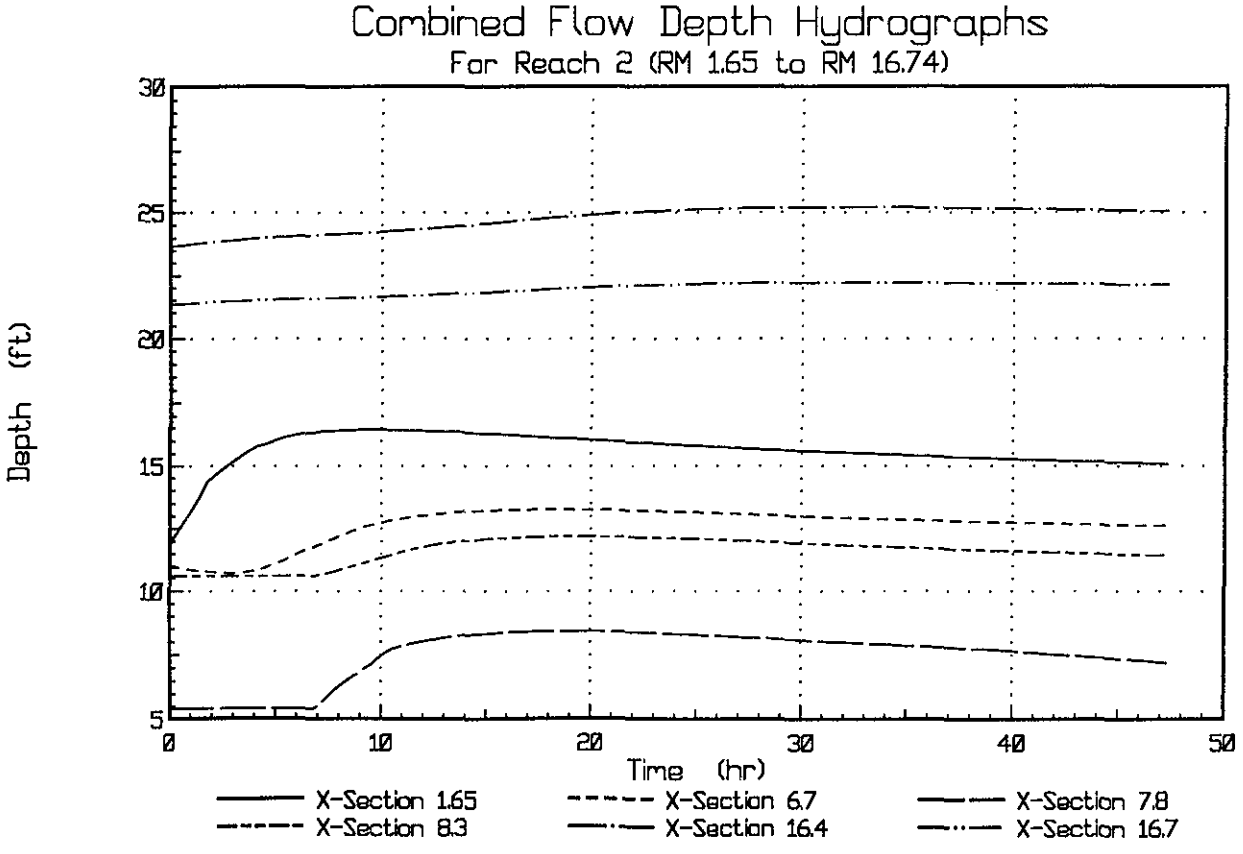


Note: Start of Failure at 0.5 Hours.

* Outflow hydrograph from Horn Pond Dam.

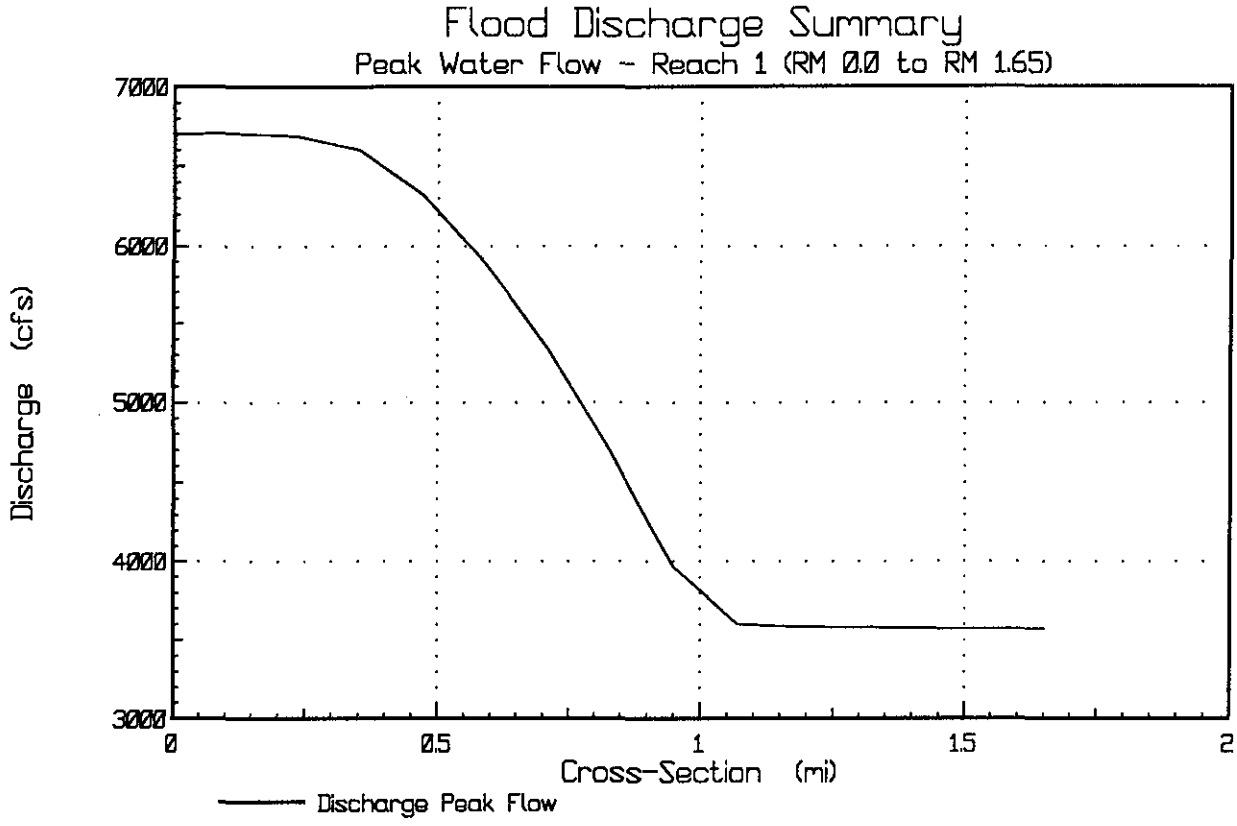
PLATE 10

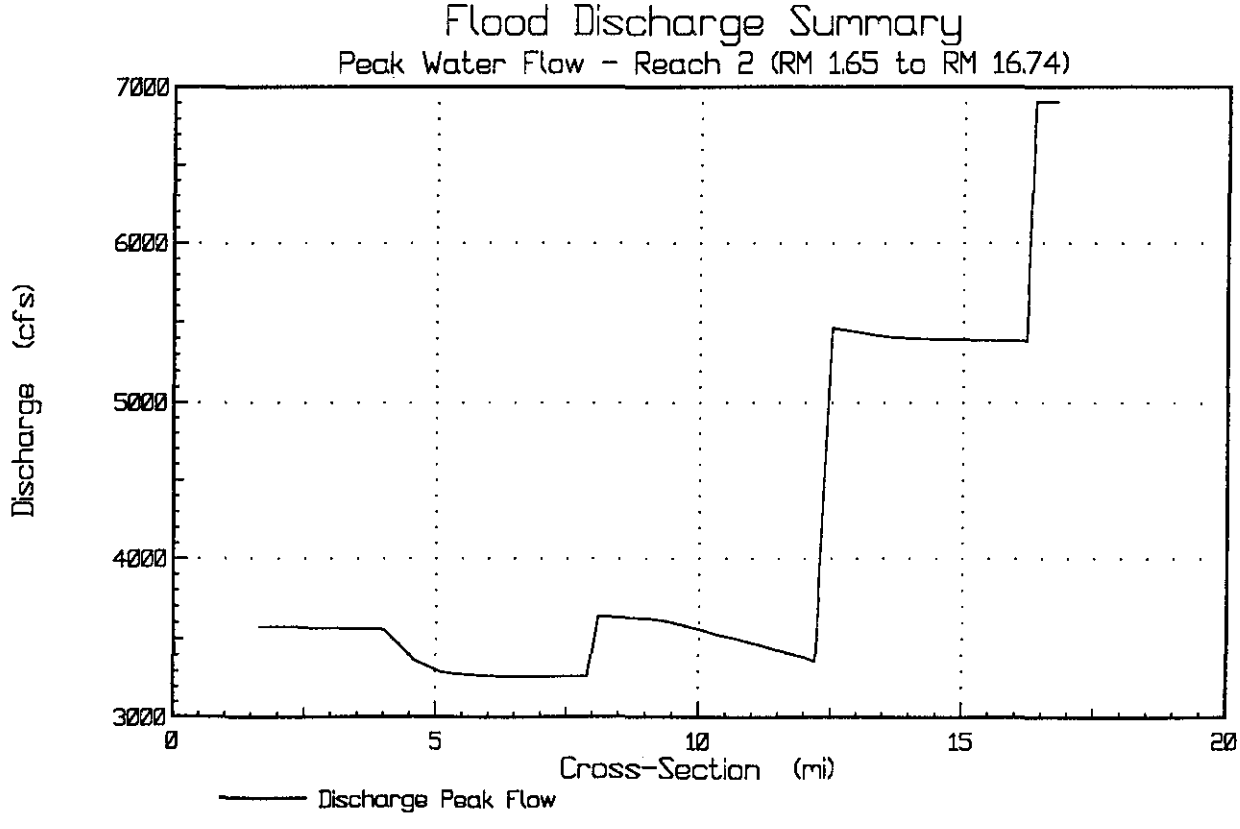




Note: Start of Dam Failure at 0.5 Hours.

PLATE 11


Flood Discharge Summary
Peak Water Flow - Reach 1 (RM 0.0 to RM 1.65)
Discharge (cfs)
7000
6000
5000
4000
3000
0
0.5
1
1.5
2
Cross-Section (mi)
Discharge Peak Flow


Flood Discharge Summary
Peak Water Flow - Reach 2 (RM 1.65 to RM 16.74)
Discharge (cfs)
7000
6000
5000
4000
3000
0
5
10
15
20
Cross-Section (mi)
Discharge Peak Flow

Appendix I:

Inundation Mapping

Great East Lake

Great East Lake Dam-Breach Inundation Limits

Cross Section Location

+ RM River Miles Downstream From Great East Lake Dam

Match Line - Sheet 2

SCALE: 1" : 1,000' Contour Interval 20 Feet

US Army Corps of Engineers
New England District
Concord, Massachusetts

Salmon Falls River
Dam-Break Flood Analysis

INUNDATION MAPPING

Sheet 1 of 2

W.M.S. Jun. 1998

PLATE 3

Match Line - Sheet 1

Laskey Corner

Miller Corner

Town House

Town House Pond

Milton Pond

Fernald Shore

Black Pond

Milton

Milton Ridge

Salmon Falls River

Pond Falls

Trailer Park

Campground

Prospect Hill Cem

Milton Nute High Sch

NEW HAMPSHIRE / MAINE

RM 9.0

RM 10.0

RM 11.0

RM 12.0

RM 13.0

RM 14.0

RM 15.0

RM 16.0

BM 445.9

BM 716.3

BM 596.4

BM 460.0

BM 435.7

WL 413

WL 408

WL 407

LEGEND

Great East Lake Dam-Breach Inundation Limits

Cross Section Location

+ RM River Miles Downstream From Great East Lake Dam

US Army Corps of Engineers
New England District
Concord, Massachusetts

Salmon Falls River
Dam-Break Flood Analysis

INUNDATION MAPPING
Sheet 2 of 2

W.M.S. Jun. 1998

SCALE: 1" : 1,000' Contour Interval 20 Feet

PLATE 4